

## VIDEO SCREEN INCORPORATED IN VEHICLE SEAT

### BACKGROUND OF THE INVENTION

[0001] The invention relates to a video screen which is pivotally arranged on a fitting, especially on the back rest of a vehicle seat.

[0002] A video screen of the generic type is disclosed in the publication DE 197 08 764 A1. In the vehicle seat for a railroad car disclosed therein a screen, which can be viewed by a passenger seated behind, is let centrally into the rear side of the back rest. The angle of inclination of the screen can be adjusted and the screen can therefore be tilted about a horizontal axis running transversely to the direction of the seat, both for adjustment to the stature of the viewer and to avoid reflected light on the surface of the screen. The facilities for adjustment are limited, however, and are therefore capable of yielding a satisfactory result only with a relatively large interval between the seats. This is something which is not always feasible, particularly in compact motor vehicles.

[0003] The object of the invention is to provide a video screen which is particularly suitable for fitting in a motor vehicle and which can be viewed comfortably by occupants of different stature.

### SUMMARY OF THE INVENTION

[0004] According to the invention this object is achieved in that a video screen of the generic type can be adjusted, in particular folded from a first, lower position of use into a second, upper position of use.

[0005] The video screen is preferably arranged on a pivoting arm, which is connected to the fitting so that it can rotate about a basically horizontally axis. At the same time the screen is advantageously capable of pivoting in relation to the fitting through an angle of 150° to 210°, in particular approximately 180°, from the first position of use, especially under the effect of a spring force opposed to the gravitational force, towards the viewer up into the second, basically vertical position of use.

[0006] In order to prevent damage to the video screen when not in use, the video screen can furthermore be pivoted from a stowed position upwards into the first, lower position of use. For this purpose it preferably performs a rotation through an angle of  $10^{\circ}$  to  $20^{\circ}$ , in particular approximately  $15^{\circ}$ , from the stowed position into the first, lower position of use.

[0007] According to a further advantageous development of the invention the video screen is in turn rotatably supported on the pivoting arm and is rotatable about a basically horizontal, but in principle also vertical or inclined axis in relation to the pivoting arm, for example through an angle of  $150^{\circ}$  to  $210^{\circ}$ , in particular approximately  $180^{\circ}$ . At its end facing of the screen, the pivoting arm preferably forms a frame, inside which the screen is rotatably arranged. In this case the axis of rotation of the screen may run centrally in the frame, but also asymmetrically with an offset in relation to the center of the frame.

[0008] In order to hold the video screen securely in each position of use, the articulated joints between the fitting and the pivoting arm and/or between the pivoting arm and the screen may be provided with a non-positive arresting device and/or positive locking device.

[0009] The articulated joint between the fitting and the pivoting arm and the articulated joint between the pivoting arm and the screen furthermore advantageously interact with one another through the use of a torque transmitting device, in such a way that when folding the pivoting arm in relation to the fitting the screen is turned through a basically equal angle in relation to the pivoting arm. This automatically ensures that the viewing window faces the viewer both in the lower and in the upper position of use. At the same time it is in principle possible to have the screen rotate in the same or in the opposite direction to the direction of rotation of the pivoting arm. The torque transmitting device may then take the form, for example, of a belt drive with belt strands running parallel to one another or crossing one another.

[0010] A vehicle seat is equipped to particular advantage with a screen according to the invention where the screen is rotatably supported in the area of the upper edge of the back rest. In this case the screen is preferably arranged behind the rear side of the back rest in the first, lower position of use, and behind the head restraint in the second, upper position of use. If the vehicle seat in question is occupied by the driver or front-seat

passenger of a motor vehicle, for example, the screen can be comfortably viewed not only in the lower position of use by children sitting in the second row of seats but also in the upper position of use by adults sitting in the same location. The screen may equally well be arranged on the back rest of the second row of seats and viewed by the occupants of a third row of seats, which have of late become common in so-called multipurpose vehicles.

[0011] To protect it from cargo, the screen, in a stowed position, for example, can preferably be adjusted by turning it through an angle of 150° to 210°, in particular through approximately 180°, in relation to the pivoting arm into a protected position in which its display is turned towards the back rest.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The drawings show schematic representations of various exemplary embodiments of the invention, in which

[0013] Fig. 1 shows a motor vehicle seat, equipped according to the invention with a screen in the upper position of use, and an intermediate position

[0014] Fig. 2 shows the seat according to Fig. 1 with screen in the lower position of use

[0015] Fig. 3 shows the vehicle seat represented in Fig. 1 and 2 with screen in the stowed position

[0016] Fig. 4 shows a vehicle seat having a screen according to claim 12.

## DETAILED DESCRIPTION

[0017] A video screen 1 represented in Fig. 1 can be folded, by means of a pivoting arm 2, about a horizontal axis of rotation 3 running transversely to the direction of a seat, the screen 1 being arranged on the upper edge of the back rest 4 of a vehicle seat 5, for example of the driver's or front passenger seat of a motor vehicle. In an upper position of use (position A) the display 6 of the screen 1 is situated basically at eye level for an adult occupant 8 of the vehicle, seated on the rear seat 7, on the rear side of the head restraint 9 of the vehicle seat 5. On its rear side, the head restraint 9 has a recess 10, which partially accommodates the screen 1 in the upper position of use.

[0018] The pivoting arm 2 has a rectangular frame 11, which fully encloses the screen 1. The screen 1 is supported centrally in the frame 11 so that it can rotate about a further axis of rotation 12 offset parallel to the axis of rotation 3.

[0019] The articulated joints assigned to the axes of rotation 3 and 12 are equipped with means for releasable locking, in order to keep the screen 1 in the upper position of use and the display 6 at the desired inclination relative to the viewer.

[0020] By folding the pivoting arm 2 downwards (arrow X) through approximately  $180^\circ$  about the axis of rotation 3 towards the rear seat 7 (intermediate position B), the screen can be shifted into a further, lower position of use (position C), which is depicted in Fig. 2. The screen is now situated behind the back rest 4 of the vehicle seat 5. In order that the display 6 will also face the occupant 8 in the lower position of use, the screen 1 in the intermediate position according to Fig. 1 is in turn rotated through approximately  $180^\circ$  (arrow Y) in the frame 11. In the exemplary embodiment, this movement is performed manually. By tilting the screen 1 in the frame 11 (arrow Z) a further adjustment to suit the position of the occupant 8 can be performed in each position of use.

[0021] In order to protect the display 6 of the screen 1 from damage when not in use, it can furthermore be brought into the stowed position D represented in Fig. 3, which is inclined by approximately  $15^\circ$  to the back rest 4 compared to the lower position of use (position C). Before adjusting it to the stowed position D, the screen 1 must be folded from the lower position of use (position C) into the intermediate position B, in which the screen 1 is rotated in the frame 11 about the axis of rotation 12 in such a way that the display

6 in the stowed position D is turned towards the backrest 4. Consequently only the robust rear side 13 of the screen 1 is exposed to potential contact with cargo 14 situated on the rear seat 7.

**[0022]** From the upper position of use (position A) the screen 1 can be folded about the axis of rotation 3 straight into the stowed position D, since in this case the display 6 already has the desired orientation in relation to the back rest 4.

**[0023]** An automatic turning of the screen 1 in the frame 11 when folding it down from the upper into the lower position of use can be brought about in that the rotational movement in the axis of rotation 3 is transmitted to the axis of rotation 12 in the same or in the opposite direction.

**[0024]** In the exemplary embodiment according to Fig. 4 a belt drive 15, comprising a belt 16 with belts strands 17, 17' running parallel to one another and belt pulleys 18, 18' arranged in the area of the axes of rotation 3, 12, which synchronizes the rotation in the direction of the arrows X and Y, is used for this purpose.